

STANDARDS DEVELOPMENT BRANCH OMCE



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## **Drinking Water Surveillance Program**

# **BAYSIDE SCHOOL WATER TREATMENT PLANT**

**Annual Report 1987**

**TD  
380  
.B397  
1988  
MOE**



**Environment  
Ontario**

Jim Bradley, Minister

**TD  
380  
.B397  
1988**

Bayside school water treatment  
plant : annual report 1987.

79177

1987  
BAY  
1988

ISSN 0840-5603

**BAYSIDE SCHOOL  
WATER TREATMENT PLANT**

**DRINKING WATER SURVEILLANCE  
PROGRAM**

**ANNUAL REPORT 1987**

**ONTARIO MINISTRY OF ENVIRONMENT  
OCTOBER 1988**

c Queen's Printer for Ontario, 1988

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### ACKNOWLEDGEMENTS

The Drinking Water Surveillance Program (DWSP) employs a team approach requiring the co-operative effort of the Ministry of the Environment (MOE) staff from Water Resources and Laboratory Services Branch and the Regions, as well as plant operational staff from the Municipalities.

This annual report was produced by the DWSP Group (Ron Hunsinger, Peter Bohm, Carol Sackville-Duyvelshoff, Chris Fung and John McGrachan) and by Pat Lachmaniuk (on developmental assignment to the Drinking Water Section).

Helpful input and reviews were received from Drinking Water Section Staff, in addition to reviews by other MOE and municipal personnel.

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### BAYSIDE SCHOOL WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Bayside School Water Treatment Plant is a conventional treatment plant that treats water from the Bay of Quinte. The treatment process consists of coagulation, flocculation, filtration and disinfection. This plant serves the three schools in Bayside, a population of 1,200 and has a design capacity of 0.11 x 1000m<sup>3</sup>/day.

Samples of the raw and treated water were taken six times in 1987 and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in November only.

A summary of results is shown in Table 1.

Due to its sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. The ODWO for Total Coliforms was exceeded in one treated water sample. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Bayside School Water Treatment Plant produced good quality water.

## SOMMAIRE

### PROGRAMME DE SURVEILLANCE DE L'EAU POTABLE

#### STATION D'ÉPURATION DE L'EAU DE BAYSIDE RAPPORT ANNUEL 1987

Le Programme de surveillance de l'eau potable (PSEP) de l'Ontario fournit des informations immédiates, fiables et à jour sur la qualité de l'eau potable. Le PSEP a débuté officiellement en avril 1986. Il est destiné à englober tous les réseaux municipaux d'alimentation en eau de l'Ontario. Actuellement, 44 stations en font partie.

La station d'épuration de Bayside est une station classique qui traite l'eau de la baie de Quinte. Le traitement comporte la coagulation, la floculation, la filtration et la désinfection. La station dessert les trois écoles de Bayside, soit 12 000 personnes, et a une capacité nominale de 0,11 x 1 000 m<sup>3</sup>/jour.

Des prélèvements d'eau brute et d'eau traitée ont été effectués six fois en 1987 et analysés par rapport à environ 160 paramètres dans les catégories suivantes : bactériologique, inorganique et physique (analyses en laboratoire et sur place, présence de métaux) et organique (composés aromatiques chlorés, chlorophénols, pesticides et BPC, dérivés phénoliques, hydrocarbures aromatiques polynucléaires, pesticides particuliers et composés volatils). Les chlorophénols et les pesticides particuliers n'ont été analysés qu'en novembre.

Le tableau 1 résume les résultats obtenus.

En raison de la fréquence des prélèvements, le PSEP ne permet pas d'évaluer tous les aspects de la qualité bactériologique de l'eau. Cependant, comme on le recommande dans le cadre des objectifs relatifs à la qualité de l'eau potable en Ontario, un contrôle bactériologique est effectué par l'exploitant. L'analyse bactériologique limitée du PSEP a révélé une eau de bonne qualité.

Les mesures des paramètres inorganiques et physiques étaient inférieures aux limites applicables fixées par l'Ontario pour l'eau potable.

Pour environ 110 paramètres organiques mesurés, aucun résultat n'a dépassé les limites acceptables fixées pour la santé.

Un grand nombre de substances détectées apparaissent naturellement ou sont des produits dérivés de l'épuration.

Les résultats des analyses effectuées en 1987 dans le cadre du PSEP ont indiqué que la station d'épuration de Bayside donnait une eau de bonne qualité.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM      BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE BY SCAN (1987)

| SCAN                | RAW   |          |           | TREATED |          |           |
|---------------------|-------|----------|-----------|---------|----------|-----------|
|                     | TESTS | POSITIVE | %POSITIVE | TESTS   | POSITIVE | %POSITIVE |
| BACTERIOLOGICAL     | 21    | 20       | 95        | 23      | 8        | 34        |
| CHEMISTRY (FLD)     | 13    | 13       | 100       | 34      | 34       | 100       |
| CHEMISTRY (LAB)     | 112   | 101      | 90        | 112     | 75       | 66        |
| METALS              | 120   | 66       | 55        | 120     | 70       | 58        |
| CHLOROAROMATICS     | 78    | 0        | 0         | 78      | 0        | 0         |
| CHLOROPHENOLS       | 18    | 1        | 5         | 18      | 0        | 0         |
| PAH                 | 102   | 1        | 0         | 102     | 2        | 1         |
| PESTICIDES & PCB    | 150   | 0        | 0         | 150     | 0        | 0         |
| PHENOLICS           | 6     | 1        | 16        | 6       | 0        | 0         |
| SPECIFIC PESTICIDES | 114   | 0        | 0         | 114     | 0        | 0         |
| VOLATILES           | 168   | 0        | 0         | 168     | 19       | 11        |
| TOTAL               | 902   | 203      |           | 925     | 208      |           |

COLIFORMS WERE DETECTED IN ONE TREATED WATER SAMPLE. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A ' ' INDICATES THAT NO SAMPLE WAS TAKEN



## DRINKING WATER SURVEILLANCE PROGRAM

### BAYSIDE SCHOOL WATER TREATMENT PLANT 1987 ANNUAL REPORT

#### INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored. Appendix A contains a detailed description of the DWSP.

The DWSP was initiated at the Bayside School Water Treatment Plant in September 1987.

This report contains information and results for 1987.

#### PLANT DESCRIPTION

The Bayside School Water Treatment Plant is a conventional treatment package plant that treats water from the Bay of Quinte. The process consists of coagulation, flocculation, filtration and disinfection. This plant serves the three schools in Bayside, a population of 1,200 people. It has a design capacity of 0.11 x 1000m<sup>3</sup>/day and daily flows of .1 x 1000m<sup>3</sup>/day.

The plant location is shown in Figure 1. Plant Process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

#### METHODS

Water samples were obtained from two DWSP approved locations;

- i) Plant Raw - The water originated from the lowlift discharge prior to chlorination.
- ii) Plant Treated - The water originated from the highlift discharge after addition of all treatment chemicals.

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

SITE LOCATION MAP

LOCATION: BAYSIDE WATER TREATMENT PLANT



FIGURE 2  
BAYSIDE SCHOOL WATER TREATMENT PLANT

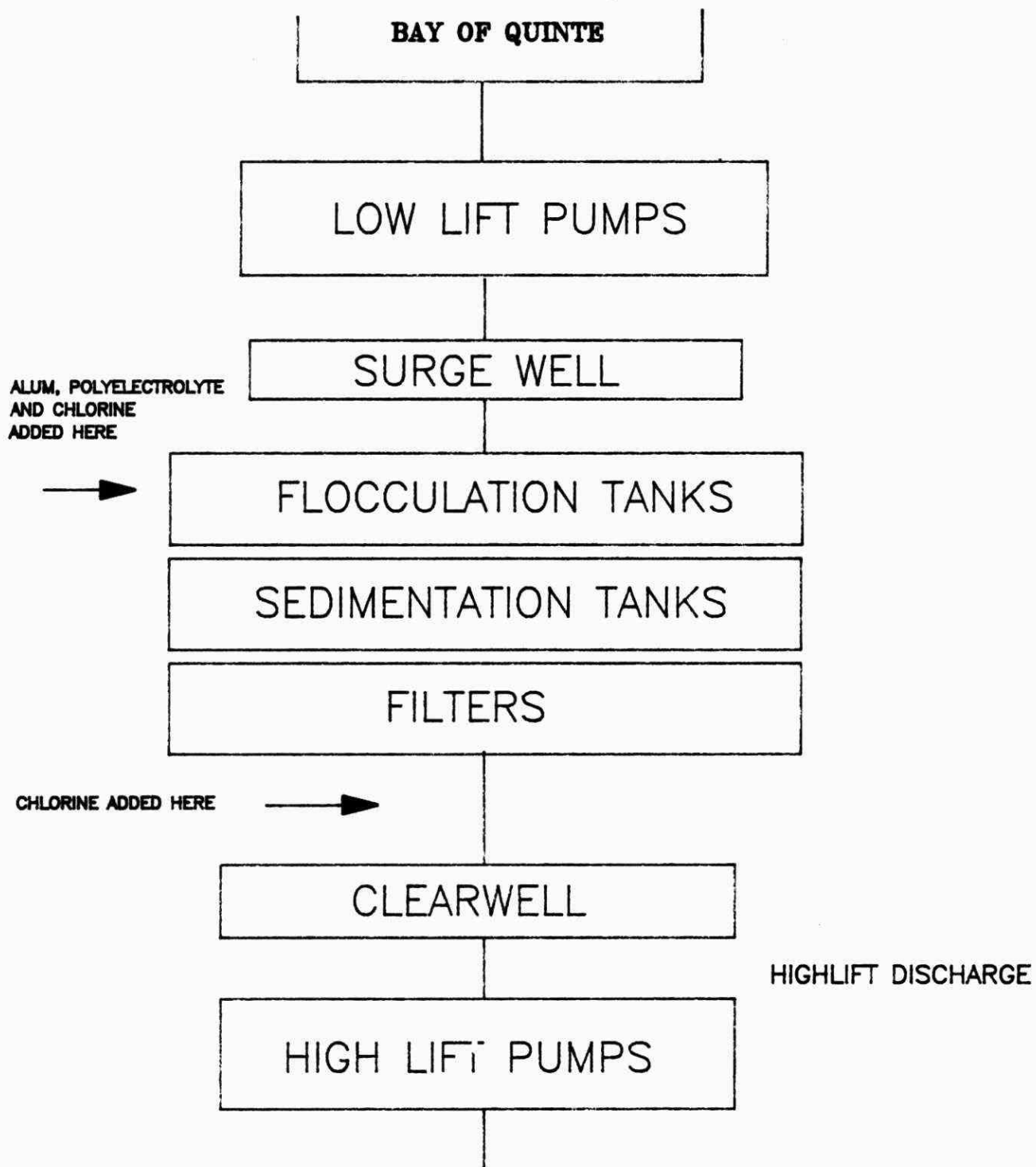


TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

BAYSIDE SCHOOL WATER SUPPLY SYSTEM

|                              |                                                         |
|------------------------------|---------------------------------------------------------|
| <u>LOCATION:</u>             | RR3<br>BELLEVILLE, ONTARIO<br>K8N 5M6<br>(613-966-2922) |
| <u>SOURCE:</u>               | RAW WATER SOURCE - BAY OF QUINTE                        |
| <u>RATED CAPACITY:</u>       | 0.11 (1000 M3/DAY)                                      |
| <u>OPERATION:</u>            | HASTINGS COUNTY BOARD OF EDUCATION                      |
| <u>PLANT SUPERINTENDENT:</u> | D. TEASDALE                                             |
| <u>MINISTRY REGION:</u>      | SOUTHEASTERN                                            |
| <u>DISTRICT OFFICER:</u>     | MR. J. BISHOP                                           |

|                                |                   |
|--------------------------------|-------------------|
| <u>MUNICIPALITY<br/>SERVED</u> | <u>POPULATION</u> |
| BAYSIDE SCHOOLS                | 1,200             |

Stringent DWSP sampling protocols were followed to eliminate any variance (Appendix B).

Sample day flow, treatment chemical dosages and Field Chemistry measurements were recorded on the day of sampling and were entered on the DWSP database as submitted.

## RESULTS

Water at the Bayside School Water Treatment Plant was sampled six times in 1987 and analyzed for approximately 160 parameters. The Specific Pesticides and Chlorophenols scans were sampled for three times in November.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed for by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 presents parameters not detected.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

## DISCUSSION

### General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently initiated by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

As stated under Results, traces do not indicate quantifiable values, as defined by established MOE Laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level

of a contaminant is not considered to be significant. DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.

#### Bacteriology

Positive results for the Bacteriology scan were present eight times in the treated water. The positive parameters were Standard Plate Count, Total Coliform and/or Total Coliform Background. The Total Coliform count of 10 counts/mL in one of the November samples exceeded the ODWO of 5 count/mL. Total Coliforms were not detected in any other sample. No other bacteriological guidelines were exceeded.

Due to the sampling frequency the bacteriological quality of water could not be fully evaluated. Routine bacteriological monitoring as recommended in the ODWOs is carried out by the operating authority. Water from the Bayside School Water Treatment Plant, in terms of the limited DWSP bacteriological examination, was generally of good quality.

#### Inorganic and Physical Parameters

##### **Laboratory and Field Chemistry**

The results for Laboratory and Field Chemistry scans were below any applicable health related ODWOs .



There are ODWOs that are set for parameters which are related to aesthetic quality rather than health; one of these is Organic Nitrogen. Organic Nitrogen values are calculated by subtracting the value for Ammonia (Ammonium Total) from the value for Total Kjeldahl Nitrogen (Nitrogen Tot Kjeld). The aesthetic ODWO of 0.15 mg/L was exceeded in all the treated water samples. When Organic Nitrogen exceeds 0.15 mg/L in treated water some taste and odour problems can result.

This guideline is exceeded in most supplies. Based on the information obtained from the DWSP, which generally indicates no problems with this parameter exceedence, the guideline may be modified when the ODWOs are reviewed.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The desired ODWO was exceeded twice in the treated water.

#### **Metals**

The results reported for the Metal scan were below applicable health related ODWOs.

Copper, Iron, Manganese and Uranium levels were lower in the treated water as compared to the raw water. This is a result of the treatment process. The addition of alum as a coagulant to the

raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit has been specified. The measure of residual Aluminum in the treated water is important to indicate efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 0.1 mg/L as Al in the water leaving the plant. Aluminum values exceeded the ODWO operational guideline four times in the treated water.

#### Organic Parameters

##### **Chloroaromatics**

Results of the Chloroaromatics scan showed that no Chloroaromatics were detected.

##### **Chlorophenols**

Results of the Chlorophenol scan showed that one Chlorophenol was detected:

##### **Pentachlorophenol**

Pentachlorophenol was detected at a trace level once in the raw water. A value of 120 ng/L was found in one of the November raw water samplings, this is below the World Health Guideline Value of 10,000 ng/L.

### **Pesticides and PCB (Polychlorinated Biphenyl)**

Results of the Pesticides and PCB scan showed that two pesticides were detected:

Alpha BHC

Lindane

Lindane consists of several isomers of BHC (Benzene Hexachloride). Alpha BHC is the isomer predominantly found in the Great Lakes basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, twice in the raw water and three times in the treated water.

Lindane was detected at trace levels, twice in the treated water.

### **Specific Pesticides**

Results of the Specific Pesticide scan showed that no Specific Pesticides were detected.

### **Phenolics**

Phenolic compounds were detected at trace levels, twice in the raw water and four times in the treated water. Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes.

### **Polynuclear Aromatic Hydrocarbons (PAH)**

Results of the PAH scan showed that one PAH was detected:

Fluoranthene

Fluoranthene was detected at 10 ng/L in one of the November raw water samples and two of the November treated water samples. Subsequent development and confirmation of detection limits according to standard analytical protocol showed that these values were at or below the detection limit (ie. at trace levels only).

#### **Volatiles**

Results of the Volatile scan showed that six parameters, other than Trihalomethanes (THMs), were detected:

- Benzene
- Toluene
- Ethylbenzene
- Para and Meta-Xylene
- Ortho-Xylene
- Tetrachloroethylene

Benzene was detected at a trace level, once in the treated water.

Toluene was detected at trace levels, once in the raw water and once in the treated water.

Ethylbenzene was detected at trace levels, four times in the treated water.

Para and Meta-Xylene are measured as one compound (M-Xylene) and were detected three times in the treated water. One positive

value was considered unreliable due to interference as per the comment UIN.

Ortho-Xylene (O-Xylene) was detected at trace levels, three times in the treated water.

These volatiles are typically found on an occasional basis at other water supplies included in the DWSP, usually at trace levels.

Tetrachloroethylene was detected at trace levels, three times in the treated water.

THMs are known to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised mainly of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane and Total THMs were detected in all of the treated waters. Chlorodibromomethane was found at trace levels in four such samples. Bromoform was not detected. All THM occurrences were well below the ODWO of 350 ug/L for Total THMs.

## CONCLUSIONS

The Bayside School Water Treatment Plant for the sample year of 1987 produced good quality water at the plant.

No health related guidelines, for organic or inorganic parameters, were exceeded during 1987.

## RECOMMENDATIONS

Two recommendations can be made:

1) The data base should be reviewed in consultation with Regional, Plant and DWSP personnel to determine if sampling location, sampling frequency and the number of parameters analysed should be revised to allow for a more efficient characterization of the water.

2) The reason for elevated Aluminum levels in treated water samples should be investigated.

TABLE 3

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

| SAMPLE DAY CONDITIONS |                        |                   | TREATMENT CHEMICAL DOSAGES (MG/L) |             |                 |                   |
|-----------------------|------------------------|-------------------|-----------------------------------|-------------|-----------------|-------------------|
| DATE                  | RETENTION<br>TIME(HRS) | FLOW<br>(1000 M3) | PRE-CHLORINATION                  | COAGULATION | COAGULATION AID | POST-CHLORINATION |
|                       |                        |                   | CHLORINE                          | ALUM LIQUID | POLYELECTROLYTE | CHLORINE          |
| SEP 24                | 1.0                    | .1                | 02.52                             | 62.40       | 00.47           | 03.77             |
| OCT 05                | .5                     | .1                | 02.40                             | 42.39       | 00.85           | 03.90             |
| OCT 19                | .7                     | .1                | 02.52                             | 58.44       | 00.47           | 03.52             |
| NOV 02                | .7                     | .1                | 02.77                             | 46.42       | 00.22           | 02.90             |
| NOV 23                | .5                     | .1                | 01.95                             | 58.45       | 01.39           | 02.15             |
| NOV 30                | .5                     | .1                | 02.02                             | 48.44       | 00.51           | 02.15             |

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                         | PARAMETER            | RAW                  |    |   | TREATED              |    |   |
|------------------------------|----------------------|----------------------|----|---|----------------------|----|---|
|                              |                      | TOTAL POSITIVE TRACE |    |   | TOTAL POSITIVE TRACE |    |   |
| BACTERIOLOGICAL              | FECAL COLIFORM MF    | 6                    | 5  | 0 | .                    | .  | . |
|                              | P/A BOTTLE           | .                    | .  | . | 6                    | 0  | 0 |
|                              | STANDRD PLATE CNT MF | 3                    | 3  | 0 | 5                    | 4  | 0 |
|                              | T COLIFORM BCKGRD MF | 6                    | 6  | 0 | 6                    | 3  | 0 |
|                              | TOTAL COLIFORM MF    | 6                    | 6  | 0 | 6                    | 1  | 0 |
| *TOTAL SCAN BACTERIOLOGICAL  |                      | 21                   | 20 | 0 | 23                   | 8  | 0 |
| *TOTAL GROUP BACTERIOLOGICAL |                      | 21                   | 20 | 0 | 23                   | 8  | 0 |
| CHEMISTRY (FLD)              | FLD CHLORINE (COMB)  | .                    | .  | . | 6                    | 6  | 0 |
|                              | FLD CHLORINE FREE    | .                    | .  | . | 6                    | 6  | 0 |
|                              | FLD PH               | 6                    | 6  | 0 | 6                    | 6  | 0 |
|                              | FLD TURBIDITY        | 1                    | 1  | 0 | 4                    | 4  | 0 |
|                              | TEMPERATURE          | 6                    | 6  | 0 | 6                    | 6  | 0 |
|                              | TOTAL CHLORINE       | .                    | .  | . | 6                    | 6  | 0 |
| *TOTAL SCAN CHEMISTRY (FLD)  |                      | 13                   | 13 | 0 | 34                   | 34 | 0 |
| CHEMISTRY (LAB)              | ALKALINITY           | 6                    | 6  | 0 | 6                    | 6  | 0 |
|                              | AMMONIUM TOTAL       | 6                    | 5  | 1 | 6                    | 2  | 3 |
|                              | CALCIUM              | 6                    | 6  | 0 | 6                    | 6  | 0 |
|                              | CHLORIDE             | 6                    | 6  | 0 | 6                    | 6  | 0 |
|                              | COLOUR               | 6                    | 6  | 0 | 6                    | 2  | 4 |



TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                        | PARAMETER            | RAW   |          |       | TREATED |          |       |
|-----------------------------|----------------------|-------|----------|-------|---------|----------|-------|
|                             |                      | TOTAL | POSITIVE | TRACE | TOTAL   | POSITIVE | TRACE |
| CHEMISTRY (LAB)             | CONDUCTIVITY         | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | CYANIDE              | 4     | 0        | 0     | 4       | 0        | 0     |
|                             | FLUORIDE             | 6     | 6        | 0     | 6       | 3        | 3     |
|                             | HARDNESS             | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | MAGNESIUM            | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | NITRITE              | 6     | 5        | 1     | 6       | 1        | 2     |
|                             | NITROGEN TOT KJELD   | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | PH                   | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | PHOSPHORUS FIL REACT | 6     | 3        | 3     | 6       | 0        | 4     |
|                             | PHOSPHORUS TTL-UNFIL | 6     | 6        | 0     | 6       | 0        | 5     |
|                             | RESIDUE (TOTAL)      | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | SODIUM               | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | TOTAL NITRATES       | 6     | 4        | 2     | 6       | 2        | 4     |
|                             | TURBIDITY            | 6     | 6        | 0     | 6       | 5        | 1     |
| *TOTAL SCAN CHEMISTRY (LAB) |                      | 112   | 101      | 7     | 112     | 75       | 26    |
| METALS                      | ALUMINUM             | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | ARSENIC              | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | BARIUM               | 6     | 6        | 0     | 6       | 6        | 0     |
|                             | BERYLLIUM            | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | BORON                | 6     | 0        | 4     | 6       | 0        | 6     |
|                             | CADMIUM              | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | CHROMIUM             | 6     | 5        | 0     | 6       | 5        | 0     |

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                              | PARAMETER            | RAW   |          |       | TREATED |          |       |
|-----------------------------------|----------------------|-------|----------|-------|---------|----------|-------|
|                                   |                      | TOTAL | POSITIVE | TRACE | TOTAL   | POSITIVE | TRACE |
| METALS                            | COBALT               | 6     | 0        | 0     | 6       | 2        | 0     |
|                                   | COPPER               | 6     | 6        | 0     | 6       | 6        | 0     |
|                                   | IRON                 | 6     | 6        | 0     | 6       | 6        | 0     |
|                                   | LEAD                 | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | MANGANESE            | 6     | 6        | 0     | 6       | 6        | 0     |
|                                   | MERCURY              | 6     | 6        | 0     | 6       | 6        | 0     |
|                                   | MOLYBDENUM           | 6     | 2        | 0     | 6       | 1        | 0     |
|                                   | NICKEL               | 6     | 3        | 0     | 6       | 5        | 0     |
|                                   | SELENIUM             | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | STRONTIUM            | 6     | 6        | 0     | 6       | 6        | 0     |
|                                   | URANIUM              | 6     | 6        | 0     | 6       | 6        | 0     |
|                                   | VANADIUM             | 6     | 2        | 0     | 6       | 3        | 0     |
|                                   | ZINC                 | 6     | 6        | 0     | 6       | 6        | 0     |
| *TOTAL SCAN METALS                |                      | 120   | 66       | 4     | 120     | 70       | 6     |
| *TOTAL GROUP INORGANIC & PHYSICAL |                      | 245   | 180      | 11    | 266     | 179      | 32    |
| CHLOROAROMATICS                   | 123 TRICHLOROBENZENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | 1234 T-CHLOROBENZENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | 1235 T-CHLOROBENZENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | 124 TRICHLOROBENZENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | 1245 T-CHLOROBENZENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | 135 TRICHLOROBENZENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                                   | 236 TRICHLOROTOLUENE | 6     | 0        | 0     | 6       | 0        | 0     |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                        | PARAMETER            | RAW   |          |       | TREATED |          |       |
|-----------------------------|----------------------|-------|----------|-------|---------|----------|-------|
|                             |                      | TOTAL | POSITIVE | TRACE | TOTAL   | POSITIVE | TRACE |
| CHLOROAROMATICS             | 245 TRICHLOROTOLUENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | 26A TRICHLOROTOLUENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | HEXACHLOROBUTADIENE  | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | HEXACHLOROETHANE     | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | OCTACHLOROSTYRENE    | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | PENTACHLOROBENZENE   | 6     | 0        | 0     | 6       | 0        | 0     |
| *TOTAL SCAN CHLOROAROMATICS |                      | 78    | 0        | 0     | 78      | 0        | 0     |
| CHLOROPHENOLS               | 234 TRICHLOROPHENOL  | 3     | 0        | 0     | 3       | 0        | 0     |
|                             | 2345 T-CHLOROPHENOL  | 3     | 0        | 0     | 3       | 0        | 0     |
|                             | 2356 T-CHLOROPHENOL  | 3     | 0        | 0     | 3       | 0        | 0     |
|                             | 245-TRICHLOROPHENOL  | 3     | 0        | 0     | 3       | 0        | 0     |
|                             | 246-TRICHLOROPHENOL  | 3     | 0        | 0     | 3       | 0        | 0     |
|                             | PENTACHLOROPHENOL    | 3     | 1        | 1     | 3       | 0        | 0     |
| *TOTAL SCAN CHLOROPHENOLS   |                      | 18    | 1        | 1     | 18      | 0        | 0     |
| PAH                         | ANTHANTHRENE         | 0     | 0        | 0     | 0       | 0        | 0     |
|                             | ANTHRACENE           | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | BENZO(A)ANTHRACENE   | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | BENZO (A) PYRENE     | 6     | 0        | 0     | 6       | 0        | 0     |
|                             | BENZO(B) CHRYSENE    | 6     | 0        | 0     | 6       | 0        | 0     |

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN             | PARAMETER            | RAW                  |   |   | TREATED              |   |   |
|------------------|----------------------|----------------------|---|---|----------------------|---|---|
|                  |                      | TOTAL POSITIVE TRACE |   |   | TOTAL POSITIVE TRACE |   |   |
| PAH              | BENZO(B) FLUORANTHEN | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | BENZO(E)PYRENE       | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | BENZO(G,H,I) PERYLEN | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | BENZO(J) FLUORANTHEN | 0                    | 0 | 0 | 0                    | 0 | 0 |
|                  | BENZO(K) FLUORANTHEN | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | CHRYSENE             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | CORONENE             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | DIBENZO(A,H) ANTHRAC | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | DIMETH. BENZ(A)ANTHR | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | FLUORANTHENE         | 6                    | 1 | 0 | 6                    | 2 | 0 |
|                  | INDENO(1,2,3-C,D) PY | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | PERYLENE             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | PHENANTHRENE         | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | PYRENE               | 6                    | 0 | 0 | 6                    | 0 | 0 |
| *TOTAL SCAN PAH  |                      | 102                  | 1 | 0 | 102                  | 2 | 0 |
| PESTICIDES & PCB | ALACHLOR             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | ALDRIN               | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | ALPHA BHC            | 6                    | 0 | 2 | 6                    | 0 | 3 |
|                  | ALPHA CHLORDANE      | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | ATRATONE             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | BETA BHC             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                  | DIELDRLN             | 6                    | 0 | 0 | 6                    | 0 | 0 |

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                         | PARAMETER          | RAW   |          |       | TREATED |          |       |
|------------------------------|--------------------|-------|----------|-------|---------|----------|-------|
|                              |                    | TOTAL | POSITIVE | TRACE | TOTAL   | POSITIVE | TRACE |
| PESTICIDES & PCB             | ENDRIN             | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | ETHYLENE DIBROMIDE | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | GAMMA CHLORDANE    | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | HCB                | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | HEPTACHLOR         | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | HEPTACHLOR EPOXIDE | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | LINDANE            | 6     | 0        | 0     | 6       | 0        | 2     |
|                              | METHOXYCHLOR       | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | MIREX              | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | OPDDT              | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | OXYCHLORDANE       | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | PCB                | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | PP-DDD             | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | PPDDE              | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | PPDDT              | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | THIODAN I          | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | THIODAN II         | 6     | 0        | 0     | 6       | 0        | 0     |
|                              | THIODAN SULPHATE   | 6     | 0        | 0     | 6       | 0        | 0     |
| *TOTAL SCAN PESTICIDES & PCB |                    | 150   | 0        | 2     | 150     | 0        | 5     |
|                              |                    |       |          |       |         |          |       |
| PHENOLICS                    | PHENOL             | 6     | 1        | 2     | 6       | 0        | 4     |
| *TOTAL SCAN PHENOLICS        |                    | 6     | 1        | 2     | 6       | 0        | 4     |

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                | PARAMETER            | RAW                  |   |   | TREATED              |   |   |
|---------------------|----------------------|----------------------|---|---|----------------------|---|---|
|                     |                      | TOTAL POSITIVE TRACE |   |   | TOTAL POSITIVE TRACE |   |   |
| SPECIFIC PESTICIDES | 2,4,5-T              | 3                    | 0 | 0 | 3                    | 0 | 0 |
|                     | 2,4-D                | 3                    | 0 | 0 | 3                    | 0 | 0 |
|                     | 2,4-DP               | 3                    | 0 | 0 | 3                    | 0 | 0 |
|                     | 24DCHLRPHENOXYBUTYRC | 3                    | 0 | 0 | 3                    | 0 | 0 |
|                     | AMETRYNE             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                     | AMINOCARB            | 0                    | 0 | 0 | 0                    | 0 | 0 |
|                     | ATRAZINE             | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                     | BENOMYL              | 0                    | 0 | 0 | 0                    | 0 | 0 |
|                     | BLADEX               | 6                    | 0 | 0 | 6                    | 0 | 0 |
|                     | BUX                  | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | CARBOFURAN           | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | CIPC                 | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | DIALATE              | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | DIAZINON             | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | DICAMBA              | 3                    | 0 | 0 | 3                    | 0 | 0 |
|                     | DICHLOROVOS          | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | DURSBAN              | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | EPTAM                | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | ETHION               | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | GUTHION              | 0                    | 0 | 0 | 0                    | 0 | 0 |
|                     | IPC                  | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | MALATHION            | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | METHYL PARATHION     | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | METHYLTRITHION       | 2                    | 0 | 0 | 2                    | 0 | 0 |
|                     | METOLACHLOR          | 6                    | 0 | 0 | 6                    | 0 | 0 |

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                            | PARAMETER            | RAW   |          |       | TREATED |          |       |
|---------------------------------|----------------------|-------|----------|-------|---------|----------|-------|
|                                 |                      | TOTAL | POSITIVE | TRACE | TOTAL   | POSITIVE | TRACE |
| SPECIFIC PESTICIDES             | MEVINPHOS            | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | PARATHION            | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | PHORATE              | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | PICHLORAM            | 0     | 0        | 0     | 0       | 0        | 0     |
|                                 | PROMETONE            | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | PROMETRYNE           | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | PROPACINE            | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | PROPOXUR             | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | RELDAN               | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | RONNEL               | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | SENCOR               | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | SEVIN                | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | SILVEX               | 3     | 0        | 0     | 3       | 0        | 0     |
|                                 | SIMAZINE             | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | SUTAN                | 2     | 0        | 0     | 2       | 0        | 0     |
|                                 | TOXAPHENE            | 0     | 0        | 0     | 0       | 0        | 0     |
| *TOTAL SCAN SPECIFIC PESTICIDES |                      | 114   | 0        | 0     | 114     | 0        | 0     |
| VOLATILES                       | 1,1 DICHLOROETHANE   | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | 1,1 DICHLOROETHYLENE | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | 1,2 DICHLOROBENZENE  | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | 1,2 DICHLOROETHANE   | 6     | 0        | 0     | 6       | 0        | 0     |
|                                 | 1,2 DICHLOROPROPANE  | 6     | 0        | 0     | 6       | 0        | 0     |

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE OF RESULTS (1987)

| SCAN                  | PARAMETER            | RAW                  |     |    | TREATED              |     |    |
|-----------------------|----------------------|----------------------|-----|----|----------------------|-----|----|
|                       |                      | TOTAL POSITIVE TRACE |     |    | TOTAL POSITIVE TRACE |     |    |
| VOLATILES             | 1,3 DICHLOROBENZENE  | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | 1,4 DICHLOROBENZENE  | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | 111, TRICHLOROETHANE | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | 112 TRICHLOROETHANE  | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | 1122 T-CHLOROETHANE  | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | BENZENE              | 6                    | 0   | 0  | 6                    | 0   | 1  |
|                       | BROMOFORM            | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | CARBON TETRACHLORIDE | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | CHLOROBENZENE        | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | CHLORODIBROMOMETHANE | 6                    | 0   | 0  | 6                    | 0   | 4  |
|                       | CHLOROFORM           | 6                    | 0   | 0  | 6                    | 6   | 0  |
|                       | DICHLOROBROMOMETHANE | 6                    | 0   | 0  | 6                    | 6   | 0  |
|                       | DICHLOROMETHANE      | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | ETHYLBENZENE         | 6                    | 0   | 0  | 6                    | 0   | 4  |
|                       | M-XYLENE             | 6                    | 0   | 0  | 6                    | 1   | 3  |
|                       | O-XYLENE             | 6                    | 0   | 0  | 6                    | 0   | 3  |
|                       | P-XYLENE             | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | T-CHLOROETHYLENE     | 6                    | 0   | 1  | 6                    | 0   | 1  |
|                       | T1,2DICHLOROETHYLENE | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | TOLUENE              | 6                    | 0   | 1  | 6                    | 0   | 1  |
|                       | TOTL TRIHALOMETHANES | 6                    | 0   | 0  | 6                    | 6   | 0  |
|                       | TRICHLOROETHYLENE    | 6                    | 0   | 0  | 6                    | 0   | 0  |
|                       | TRIFLUOROCHLOROTOLUE | 6                    | 0   | 0  | 6                    | 0   | 0  |
| *TOTAL SCAN VOLATILES |                      | 168                  | 0   | 2  | 168                  | 19  | 17 |
| *TOTAL GROUP ORGANIC  |                      | 636                  | 3   | 7  | 636                  | 21  | 26 |
| -----                 |                      |                      |     |    |                      |     |    |
| TOTAL                 |                      | 902                  | 203 | 18 | 925                  | 208 | 58 |



## KEY TO TABLES 5 AND 6

- A    ONTARIO DRINKING WATER OBJECTIVES
1. Maximum Acceptable Concentration (MAC)
  - 1+. MAC for Total Trihalomethanes
  - 1\*. MAC for Bacteriological Analyses
- Poor water quality is indicated when :
- total coliform counts  $> 0 < 5$
  - P/A Bottle Test is present after 48 hours
  - Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
  - Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
  - Standard Plate Count should not exceed 500 organisms per ml at 35 deg C within 48 hours
2. Interim Maximum Acceptable Concentration (IMAC)
  3. Maximum Desirable Concentration (MDC)
  4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness  $> 200$  mg/L are considered poor and those in excess of 500 mg/L are unacceptable.
- B    HEALTH & WELFARE CANADA
1. Maximum Acceptable Concentration (MAC)
  2. Proposed MAC
  3. Interim MAC
- C    WORLD HEALTH ORGANIZATION
1. Guideline Value (GV)
  2. Tentative GV
  3. Aesthetic GV
- D    US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
  2. Suggested No-Adverse Effect Level (SNAEL)
  3. Lifetime Health Advisory
  4. EPA Ambient Water Quality Criteria
- F    EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
  2. Aesthetic Guideline Level
  3. Maximum Admissable Concentration (MADC)
- G    CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- H    USSR MAXIMUM PERMISSIBLE CONCENTRATION
- I    NEW YORK STATE AMBIENT WATER GUIDELINE

|     |                                              |
|-----|----------------------------------------------|
| RMP | P and M-Xylene Not Separated                 |
| RRV | Rerun Verification                           |
| RVU | Reported Value Unusual                       |
| SPS | Several Peaks, Small, Not Priority Pollutant |
| UAL | Unreliable: Sample Age Exceeds Normal Limit  |
| UCR | Unreliable: Could Not Confirm By Reanalysis  |
| UCS | Unreliable: Contamination Suspected          |
| UIN | Unreliable: Indeterminant Interference       |
| XP  | Positive After X Number of Hours             |

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT            |          | DISTRIBUTION SYSTEM |                         |
|----------------------------------|----------|---------------------|-------------------------|
| RAW                              | TREATED  |                     |                         |
| <hr/>                            |          |                     |                         |
| BACTERIOLOGICAL                  |          |                     |                         |
| FECAL COLIFORM MF (CT/100ML )    |          | DET'N LIMIT = 0     | GUIDELINE = 0 (A1)      |
| SEP                              | 2        | .                   |                         |
| OCT                              | 4        | .                   |                         |
|                                  | 5        | .                   |                         |
| NOV                              | 0        | .                   |                         |
|                                  | 10       | .                   |                         |
|                                  | 34       | .                   |                         |
| <hr/>                            |          |                     |                         |
| STANDRD PLATE CNT MF (CT/ML )    |          | DET'N LIMIT = 0     | GUIDELINE = 500/ML (A1) |
| SEP                              | !AW      | !AW                 |                         |
| OCT                              | 2400 >   | 0                   |                         |
|                                  | !OP      | 11                  |                         |
| NOV                              | 1600     | 5                   |                         |
|                                  | 460      | 4                   |                         |
|                                  | !OP      | 1                   |                         |
| <hr/>                            |          |                     |                         |
| P/A BOTTLE (0=ABSENT )           |          | DET'N LIMIT = 0     | GUIDELINE = 0 (A1*)     |
| SEP                              | .        | 0                   |                         |
| OCT                              | .        | 0                   |                         |
|                                  | .        | 0                   |                         |
| NOV                              | .        | 0                   |                         |
|                                  | .        | 0                   |                         |
|                                  | .        | 0                   |                         |
| <hr/>                            |          |                     |                         |
| TOTAL COLIFORM MF (CT/100ML )    |          | DET'N LIMIT = 0     | GUIDELINE = 5/100ML(A1) |
| SEP                              | 4 A3C    | 0                   |                         |
| OCT                              | 100      | 0                   |                         |
|                                  | 11 A3C   | 0                   |                         |
| NOV                              | 700      | 0                   |                         |
|                                  | 5200     | 0                   |                         |
|                                  | 4500 A3C | 10                  |                         |
| <hr/>                            |          |                     |                         |
| T COLIFORM BCKGRD MF (CT/100ML ) |          | DET'N LIMIT = 0     | GUIDELINE = N/A         |
| SEP                              | 11200    | 2                   |                         |
| OCT                              | 22000    | 0                   |                         |
|                                  | 540      | 1                   |                         |
| NOV                              | 2800     | 0                   |                         |
|                                  | 3500     | 0                   |                         |
|                                  | 41000    | 19                  |                         |

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT       |         | DISTRIBUTION SYSTEM |                          |
|-----------------------------|---------|---------------------|--------------------------|
| RAW                         | TREATED |                     |                          |
| -----                       |         |                     |                          |
| CHEMISTRY (FLD)             |         |                     |                          |
| FLD CHLORINE (COMB) (MG/L ) |         | DET'N LIMIT = N/A   | GUIDELINE = N/A          |
| SEP                         | .300    |                     |                          |
| OCT                         | .300    |                     |                          |
|                             | 1.300   |                     |                          |
| NOV                         | 2.000   |                     |                          |
|                             | 1.300   |                     |                          |
|                             | 1.100   |                     |                          |
| -----                       |         |                     |                          |
| FLD CHLORINE FREE (MG/L )   |         | DET'N LIMIT = N/A   | GUIDELINE = N/A          |
| SEP                         | 1.200   |                     |                          |
| OCT                         | 1.400   |                     |                          |
|                             | 1.000   |                     |                          |
| NOV                         | 1.900   |                     |                          |
|                             | 1.000   |                     |                          |
|                             | 1.000   |                     |                          |
| -----                       |         |                     |                          |
| TOTAL CHLORINE (MG/L )      |         | DET'N LIMIT = N/A   | GUIDELINE = N/A          |
| SEP                         | 1.500   |                     |                          |
| OCT                         | 1.700   |                     |                          |
|                             | .300    |                     |                          |
| NOV                         | .100    |                     |                          |
|                             | .300    |                     |                          |
|                             | .100    |                     |                          |
| -----                       |         |                     |                          |
| FLD PH (DMSNLESS )          |         | DET'N LIMIT = N/A   | GUIDELINE = 6.5-8.5 (A4) |
| SEP                         | 7.800   | 7.200               |                          |
| OCT                         | 7.800   | 7.400               |                          |
|                             | 7.800   | 7.000               |                          |
| NOV                         | 7.600   | 7.300               |                          |
|                             | 7.600   | 7.200               |                          |
|                             | 7.800   | 7.200               |                          |
| -----                       |         |                     |                          |
| TEMPERATURE (DEG.C )        |         | DET'N LIMIT = N/A   | GUIDELINE = N/A          |
| SEP                         | 16.500  | 17.500              |                          |
| OCT                         | 11.000  | 17.000              |                          |
|                             | 11.000  | 12.000              |                          |
| NOV                         | 9.000   | 10.000              |                          |
|                             | 2.000   | 5.000               |                          |
|                             | 3.000   | 4.500               |                          |
| -----                       |         |                     |                          |
| FLD TURBIDITY (FTU )        |         | DET'N LIMIT = N/A   | GUIDELINE = 1.0 (A1)     |
| SEP                         | 4.100   | .400                |                          |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

## WATER TREATMENT PLANT

## DISTRIBUTION SYSTEM

RAW

TREATED

|     |   |      |
|-----|---|------|
| OCT | . | .300 |
|     | . | .200 |
| NOV | . | .650 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT   |         |          | DISTRIBUTION SYSTEM |                         |
|-------------------------|---------|----------|---------------------|-------------------------|
|                         | RAW     | TREATED  |                     |                         |
| -----                   |         |          |                     |                         |
| CHEMISTRY (LAB)         |         |          |                     |                         |
| ALKALINITY (MG/L )      |         |          | DET'N LIMIT = .200  | GUIDELINE = 30-500 (A4) |
| SEP                     | 101.800 | 74.400   |                     |                         |
| OCT                     | 109.700 | 92.900   |                     |                         |
|                         | 112.300 | 85.100   |                     |                         |
| NOV                     | 114.400 | 96.500   |                     |                         |
|                         | 114.100 | 88.600   |                     |                         |
|                         | 115.300 | 91.400   |                     |                         |
| -----                   |         |          |                     |                         |
| CALCIUM (MG/L )         |         |          | DET'N LIMIT = .100  | GUIDELINE = 100. (F2)   |
| SEP                     | 37.800  | 39.200   |                     |                         |
| OCT                     | 38.800  | 38.600   |                     |                         |
|                         | 41.000  | 39.400   |                     |                         |
| NOV                     | 42.400  | 43.800   |                     |                         |
|                         | 42.400  | 41.200   |                     |                         |
|                         | 43.200  | 42.400   |                     |                         |
| -----                   |         |          |                     |                         |
| CHLORIDE (MG/L )        |         |          | DET'N LIMIT = .200  | GUIDELINE = 250.0 (A3)  |
| SEP                     | 12.000  | 17.500   |                     |                         |
| OCT                     | 11.500  | 17.000   |                     |                         |
|                         | 11.400  | 15.400   |                     |                         |
| NOV                     | 11.100  | 17.000   |                     |                         |
|                         | 10.500  | 13.500   |                     |                         |
|                         | 10.600  | 14.200   |                     |                         |
| -----                   |         |          |                     |                         |
| COLOUR (TCU )           |         |          | DET'N LIMIT = .5    | GUIDELINE = 5.0 (A3)    |
| SEP                     | 12.500  | 1.500 <T |                     |                         |
| OCT                     | 13.000  | 2.000 <T |                     |                         |
|                         | 12.500  | 1.500 <T |                     |                         |
| NOV                     | 12.500  | 2.000 <T |                     |                         |
|                         | 12.500  | 3.000    |                     |                         |
|                         | 12.000  | 3.000    |                     |                         |
| -----                   |         |          |                     |                         |
| CONDUCTIVITY (UMHO/CM ) |         |          | DET'N LIMIT = 1     | GUIDELINE = 400. (F2)   |
| SEP                     | 255     | 288      |                     |                         |
| OCT                     | 266     | 296      |                     |                         |
|                         | 270     | 297      |                     |                         |
| NOV                     | 274     | 304      |                     |                         |
|                         | 276     | 297      |                     |                         |
|                         | 270     | 299      |                     |                         |
| -----                   |         |          |                     |                         |
| FLUORIDE (MG/L )        |         |          | DET'N LIMIT = .01   | GUIDELINE = 2.400 (A1)  |
| SEP                     | .060    | .040 <T  |                     |                         |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT  |         |                     | DISTRIBUTION SYSTEM     |
|------------------------|---------|---------------------|-------------------------|
|                        | RAW     | TREATED             |                         |
| <hr/>                  |         |                     |                         |
| OCT                    | .060    | .060                |                         |
|                        | .080    | .040 <T             |                         |
| NOV                    | .100    | .060                |                         |
|                        | .060    | .020 <T             |                         |
|                        | .060    | .040                |                         |
| <hr/>                  |         |                     |                         |
| HARDNESS (MG/L )       |         | DET'N LIMIT = .500  | GUIDELINE = 80-100 (A4) |
| SEP                    | 117.000 | 120.000             |                         |
| OCT                    | 122.000 | 121.000             |                         |
|                        | 126.000 | 121.000             |                         |
| NOV                    | 130.000 | 133.000             |                         |
|                        | 128.000 | 124.000             |                         |
|                        | 131.000 | 128.000             |                         |
| <hr/>                  |         |                     |                         |
| MAGNESIUM (MG/L )      |         | DET'N LIMIT = .050  | GUIDELINE = 30. (F2)    |
| SEP                    | 5.600   | 5.400               |                         |
| OCT                    | 6.000   | 5.800               |                         |
|                        | 5.700   | 5.400               |                         |
| NOV                    | 5.800   | 5.800               |                         |
|                        | 5.400   | 5.200               |                         |
|                        | 5.700   | 5.300               |                         |
| <hr/>                  |         |                     |                         |
| SODIUM (MG/L )         |         | DET'N LIMIT = .200  | GUIDELINE = 200. (C3)   |
| SEP                    | 7.800   | 11.800              |                         |
| OCT                    | 7.800   | 12.200              |                         |
|                        | 7.600   | 10.200              |                         |
| NOV                    | 7.000   | 11.800              |                         |
|                        | 6.600   | 9.400               |                         |
|                        | 6.400   | 9.000               |                         |
| <hr/>                  |         |                     |                         |
| AMMONIUM TOTAL (MG/L ) |         | DET'N LIMIT = 0.002 | GUIDELINE = .05 (F2)    |
| SEP                    | .052    | .010                |                         |
| OCT                    | .102    | .008 <T             |                         |
|                        | .050    | .002 <T             |                         |
| NOV                    | .048    | BDL                 |                         |
|                        | .022    | .020                |                         |
|                        | .006 <T | .004 <T             |                         |
| <hr/>                  |         |                     |                         |
| NITRITE (MG/L )        |         | DET'N LIMIT = 0.001 | GUIDELINE = 1.000 (A1)  |
| SEP                    | .069    | .005                |                         |
| OCT                    | .007    | .002 <T             |                         |
|                        | .005    | BDL                 |                         |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT        |         |         | DISTRIBUTION SYSTEM  |                         |
|------------------------------|---------|---------|----------------------|-------------------------|
|                              | RAW     | TREATED |                      |                         |
| -----                        |         |         |                      |                         |
| NOV                          | .004 <T | BDL     |                      |                         |
|                              | .011    | .004 <T |                      |                         |
|                              | .006    | BDL     |                      |                         |
| -----                        |         |         |                      |                         |
| TOTAL NITRATES (MG/L )       |         |         | DET'N LIMIT = .020   | GUIDELINE = 10.000 (A1) |
| SEP                          | .085 <T | .040 <T |                      |                         |
| OCT                          | .120    | .050 <T |                      |                         |
|                              | .045 <T | .040 <T |                      |                         |
| NOV                          | .130    | .080 <T |                      |                         |
|                              | .140    | .140    |                      |                         |
|                              | .220    | .230    |                      |                         |
| -----                        |         |         |                      |                         |
| NITROGEN TOT KJELD (MG/L )   |         |         | DET'N LIMIT = .020   | GUIDELINE = N/A         |
| SEP                          | .610    | .250    |                      |                         |
| OCT                          | .660    | .220    |                      |                         |
|                              | .590    | .240    |                      |                         |
| NOV                          | .570    | .340    |                      |                         |
|                              | .630    | .300    |                      |                         |
|                              | .490    | .240    |                      |                         |
| -----                        |         |         |                      |                         |
| PH (DMSNLESS )               |         |         | DET'N LIMIT = N/A    | GUIDELINE = 6.5-8.5(A4) |
| SEP                          | 8.120   | 8.120   |                      |                         |
| OCT                          | 8.230   | 8.130   |                      |                         |
|                              | 8.310   | 7.980   |                      |                         |
| NOV                          | 8.240   | 8.020   |                      |                         |
|                              | 8.300   | 7.950   |                      |                         |
|                              | 8.290   | 8.080   |                      |                         |
| -----                        |         |         |                      |                         |
| PHOSPHORUS FIL REACT (MG/L ) |         |         | DET'N LIMIT = .5UG/L | GUIDELINE = N/A         |
| SEP                          | .003    | .000 <T |                      |                         |
| OCT                          | .008    | .000 <T |                      |                         |
|                              | .001 <T | BDL     |                      |                         |
| NOV                          | .002    | BDL     |                      |                         |
|                              | .002 <T | .002 <T |                      |                         |
|                              | .001 <T | .000 <T |                      |                         |
| -----                        |         |         |                      |                         |
| PHOSPHORUS TTL-UNFIL (MG/L ) |         |         | DET'N LIMIT = .002   | GUIDELINE = .40 (F2)    |
| SEP                          | .062    | .005 <T |                      |                         |
| OCT                          | .040    | BDL     |                      |                         |
|                              | .030    | .002 <T |                      |                         |
| NOV                          | .024    | .005 <T |                      |                         |
|                              | .029    | .004 <T |                      |                         |



TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT   |         |                   | DISTRIBUTION SYSTEM   |  |
|-------------------------|---------|-------------------|-----------------------|--|
|                         | RAW     | TREATED           |                       |  |
| <hr/>                   |         |                   |                       |  |
| NOV                     | .029    | .004 <T           |                       |  |
| <hr/>                   |         |                   |                       |  |
| RESIDUE (TOTAL) (MG/L ) |         | DET'N LIMIT = 1.  | GUIDELINE = 500. (A3) |  |
| SEP                     | 166 CRO | 187 CRO           |                       |  |
| OCT                     | 173 CRO | 192 CRO           |                       |  |
|                         | 176 CRO | 193 CRO           |                       |  |
| NOV                     | 178 CRO | 198 CRO           |                       |  |
|                         | 173     | 193 CRO           |                       |  |
|                         | 163     | 194 CRO           |                       |  |
| <hr/>                   |         |                   |                       |  |
| TURBIDITY (FTU )        |         | DET'N LIMIT = .02 | GUIDELINE = 1.00 (A1) |  |
| SEP                     | 4.300   | .070 <T           |                       |  |
| OCT                     | 4.200   | .240              |                       |  |
|                         | 3.500   | .110              |                       |  |
| NOV                     | 1.010   | .320              |                       |  |
|                         | 6.100   | .440              |                       |  |
|                         | 3.000   | .500              |                       |  |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT |         | DISTRIBUTION SYSTEM |                        |
|-----------------------|---------|---------------------|------------------------|
| RAW                   | TREATED |                     |                        |
| <hr/>                 |         |                     |                        |
| METALS                |         |                     |                        |
| ALUMINUM (MG/L )      |         | DET'N LIMIT = .004  | GUIDELINE = .10 (A4)   |
| SEP                   | .120    | .039                |                        |
| OCT                   | .077    | .160                |                        |
|                       | .080    | .068                |                        |
| NOV                   | .038    | .380                |                        |
|                       | .250    | .370                |                        |
|                       | .140    | .510                |                        |
| <hr/>                 |         |                     |                        |
| BARIUM (MG/L )        |         | DET'N LIMIT = 0.001 | GUIDELINE = 1.000 (A1) |
| SEP                   | .033    | .031                |                        |
| OCT                   | .031    | .028                |                        |
|                       | .032    | .031                |                        |
| NOV                   | .030    | .028                |                        |
|                       | .031    | .026                |                        |
|                       | .027    | .025                |                        |
| <hr/>                 |         |                     |                        |
| BORON (MG/L )         |         | DET'N LIMIT = 0.01  | GUIDELINE = 5.000 (A1) |
| SEP                   | BDL     | .010 <T             |                        |
| OCT                   | .020 <T | .010 <T             |                        |
|                       | .030 <T | .020 <T             |                        |
| NOV                   | .010 <T | .020 <T             |                        |
|                       | BDL     | .010 <T             |                        |
|                       | .029 <T | .022 <T             |                        |
| <hr/>                 |         |                     |                        |
| COBALT (MG/L )        |         | DET'N LIMIT = 0.001 | GUIDELINE = 1.0 (H)    |
| SEP                   | BDL     | .001                |                        |
| OCT                   | BDL     | .001                |                        |
|                       | BDL     | BDL                 |                        |
| NOV                   | BDL     | BDL                 |                        |
|                       | BDL     | BDL                 |                        |
|                       | BDL     | BDL                 |                        |
| <hr/>                 |         |                     |                        |
| CHROMIUM (MG/L )      |         | DET'N LIMIT = 0.001 | GUIDELINE = .05 (A1)   |
| SEP                   | BDL     | BDL                 |                        |
| OCT                   | .002    | .002                |                        |
|                       | .002    | .002                |                        |
| NOV                   | .001    | .001                |                        |
|                       | .003    | .002                |                        |
|                       | .002    | .002                |                        |
| <hr/>                 |         |                     |                        |
| COPPER (MG/L )        |         | DET'N LIMIT = .001  | GUIDELINE = 1.0 (A3)   |
| SEP                   | .008    | .004                |                        |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT |      |                     | DISTRIBUTION SYSTEM |      |
|-----------------------|------|---------------------|---------------------|------|
|                       | RAW  | TREATED             |                     |      |
| -----                 |      |                     |                     |      |
| OCT                   | .008 | .006                |                     |      |
|                       | .005 | .004                |                     |      |
| NOV                   | .006 | .003                |                     |      |
|                       | .004 | .003                |                     |      |
|                       | .005 | .004                |                     |      |
| -----                 |      |                     |                     |      |
| IRON (MG/L )          |      | DET'N LIMIT = .002  | GUIDELINE = .300    | (A3) |
| SEP                   | .170 | .025                |                     |      |
| OCT                   | .096 | .014                |                     |      |
|                       | .097 | .011                |                     |      |
| NOV                   | .050 | .025                |                     |      |
|                       | .360 | .027                |                     |      |
|                       | .150 | .032                |                     |      |
| -----                 |      |                     |                     |      |
| MERCURY (UG/L )       |      | DET'N LIMIT = 0.010 | GUIDELINE = 1.000   | (A1) |
| SEP                   | .030 | .020                |                     |      |
| OCT                   | .020 | .020                |                     |      |
|                       | .030 | .020                |                     |      |
| NOV                   | .030 | .030                |                     |      |
|                       | .020 | .010                |                     |      |
|                       | .030 | .020                |                     |      |
| -----                 |      |                     |                     |      |
| MANGANESE (MG/L )     |      | DET'N LIMIT = .001  | GUIDELINE = .050    | (A3) |
| SEP                   | .052 | .003                |                     |      |
| OCT                   | .042 | .005                |                     |      |
|                       | .030 | .003                |                     |      |
| NOV                   | .017 | .004                |                     |      |
|                       | .035 | .004                |                     |      |
|                       | .014 | .004                |                     |      |
| -----                 |      |                     |                     |      |
| MOLYBDENUM (MG/L )    |      | DET'N LIMIT = 0.001 | GUIDELINE = .50     | (H)  |
| SEP                   | .001 | .001                |                     |      |
| OCT                   | BDL  | BDL                 |                     |      |
|                       | BDL  | BDL                 |                     |      |
| NOV                   | BDL  | BDL                 |                     |      |
|                       | BDL  | BDL                 |                     |      |
|                       | .002 | BDL                 |                     |      |
| -----                 |      |                     |                     |      |
| NICKEL (MG/L )        |      | DET'N LIMIT = 0.001 | GUIDELINE = .05     | (F3) |
| SEP                   | BDL  | BDL                 |                     |      |
| OCT                   | BDL  | .002                |                     |      |
|                       | .001 | .002                |                     |      |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT |      |                    | DISTRIBUTION SYSTEM |      |
|-----------------------|------|--------------------|---------------------|------|
|                       | RAW  | TREATED            |                     |      |
| -----                 |      |                    |                     |      |
| NOV                   | BDL  | .001               |                     |      |
|                       | .001 | .002               |                     |      |
|                       | .001 | .002               |                     |      |
| -----                 |      |                    |                     |      |
| STRONTIUM (MG/L )     |      | DET'N LIMIT = .001 | GUIDELINE = 2.00    | (H)  |
| SEP                   | .120 | .120               |                     |      |
| OCT                   | .120 | .110               |                     |      |
|                       | .120 | .130               |                     |      |
| NOV                   | .120 | .120               |                     |      |
|                       | .120 | .110               |                     |      |
|                       | .110 | .120               |                     |      |
| -----                 |      |                    |                     |      |
| URANIUM (UG/L )       |      | DET'N LIMIT = .02  | GUIDELINE = 20.     | (A2) |
| SEP                   | .180 | .020               |                     |      |
| OCT                   | .290 | .140               |                     |      |
|                       | .300 | .100               |                     |      |
| NOV                   | .310 | .210               |                     |      |
|                       | .350 | .100               |                     |      |
|                       | .330 | .150               |                     |      |
| -----                 |      |                    |                     |      |
| VANADIUM (MG/L )      |      | DET'N LIMIT = .001 | GUIDELINE = .10     | (H)  |
| SEP                   | .001 | .001               |                     |      |
| OCT                   | .001 | .002               |                     |      |
|                       | BDL  | .002               |                     |      |
| NOV                   | BDL  | BDL                |                     |      |
|                       | BDL  | BDL                |                     |      |
|                       | BDL  | BDL                |                     |      |
| -----                 |      |                    |                     |      |
| ZINC (MG/L )          |      | DET'N LIMIT = .001 | GUIDELINE = 5.00    | (A3) |
| SEP                   | .003 | .025               |                     |      |
| OCT                   | .005 | .016               |                     |      |
|                       | .003 | .023               |                     |      |
| NOV                   | .006 | .017               |                     |      |
|                       | .006 | .021               |                     |      |
|                       | .003 | .020               |                     |      |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

## WATER TREATMENT PLANT

## DISTRIBUTION SYSTEM

RAW

TREATED

## CHLOROPHENOLS

PENTACHLOROPHENOL (NG/L )

DET'N LIMIT = 50.

GUIDELINE = 10000. (C1)

NOV

BDL

BDL

20.000 &lt;T

BDL

120.000

BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT |         | DISTRIBUTION SYSTEM    |
|-----------------------|---------|------------------------|
| RAW                   | TREATED |                        |
| <hr/>                 |         |                        |
| FLUORANTHENE (NG/L)   | PAH     |                        |
|                       | )       | DET'N LIMIT = 0        |
|                       |         | GUIDELINE = 42000 (D4) |
| SEP                   | BDL     | BDL                    |
| OCT                   | BDL     | BDL                    |
|                       | BDL     | BDL                    |
| NOV                   | BDL     | BDL                    |
|                       | BDL     | 10.000                 |
|                       | 10.000  | 10.000                 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT |          |                     | DISTRIBUTION SYSTEM     |     |
|-----------------------|----------|---------------------|-------------------------|-----|
|                       | RAW      | TREATED             |                         |     |
| -----                 |          |                     |                         |     |
| PESTICIDES & PCB      |          |                     |                         |     |
| ALPHA BHC (NG/L )     |          | DET'N LIMIT = 1.000 | GUIDELINE = 700.        | (G) |
| SEP                   | BDL      | 2.000 <T            |                         |     |
| OCT                   | BDL      | BDL                 |                         |     |
|                       | 1.000 <T | 2.000 <T            |                         |     |
| NOV                   | BDL      | BDL                 |                         |     |
|                       | BDL      | BDL                 |                         |     |
|                       | 1.000 <T | 1.000 <T            |                         |     |
| -----                 |          |                     |                         |     |
| LINDANE (NG/L )       |          | DET'N LIMIT = 1.000 | GUIDELINE = 4000.0 (A1) |     |
| SEP                   | BDL      | 3.000 <T            |                         |     |
| OCT                   | BDL      | BDL                 |                         |     |
|                       | BDL      | 1.000 <T            |                         |     |
| NOV                   | BDL      | BDL                 |                         |     |
|                       | BDL      | BDL                 |                         |     |
|                       | BDL      | BDL                 |                         |     |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

## WATER TREATMENT PLANT

## DISTRIBUTION SYSTEM

RAW

TREATED

| PHENOLICS     |         | DET'N LIMIT = 0.2 | GUIDELINE = 2.00 (A3) |
|---------------|---------|-------------------|-----------------------|
| PHENOL (UG/L) | )       |                   |                       |
| SEP           | BDL     | BDL               |                       |
| OCT           | BDL     | .200 <T           |                       |
|               | .200 <T | .400 <T           |                       |
| NOV           | BDL     | BDL               |                       |
|               | .200 <T | .200 <T           |                       |
|               | 1.000   | .200 <T           |                       |



TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT |         |          | DISTRIBUTION SYSTEM |                        |
|-----------------------|---------|----------|---------------------|------------------------|
|                       | RAW     | TREATED  |                     |                        |
| <hr/>                 |         |          |                     |                        |
| VOLATILES             |         |          |                     |                        |
| BENZENE (UG/L )       |         |          | DET'N LIMIT = 0     | GUIDELINE = 5.0 (D1)   |
| SEP                   | BDL     | BDL      |                     |                        |
| OCT                   | BDL     | BDL      |                     |                        |
|                       | BDL     | BDL      |                     |                        |
| NOV                   | BDL     | BDL      |                     |                        |
|                       | BDL     | BDL      |                     |                        |
|                       | BDL     | .150 <T  |                     |                        |
| <hr/>                 |         |          |                     |                        |
| TOLUENE (UG/L )       |         |          | DET'N LIMIT = 0     | GUIDELINE = 100.0 (G)  |
| SEP                   | BDL     | BDL      |                     |                        |
| OCT                   | BDL     | BDL      |                     |                        |
|                       | BDL     | BDL      |                     |                        |
| NOV                   | .050 <T | .150 <T  |                     |                        |
|                       | BDL     | BDL      |                     |                        |
|                       | BDL     | BDL      |                     |                        |
| <hr/>                 |         |          |                     |                        |
| ETHYLBENZENE (UG/L )  |         |          | DET'N LIMIT = 0     | GUIDELINE = 3400. (D3) |
| SEP                   | BDL     | BDL      |                     |                        |
| OCT                   | BDL     | BDL      |                     |                        |
|                       | BDL     | .100 <T  |                     |                        |
| NOV                   | BDL     | .050 <T  |                     |                        |
|                       | BDL     | .100 <T  |                     |                        |
|                       | BDL     | .100 <T  |                     |                        |
| <hr/>                 |         |          |                     |                        |
| P-XYLENE (UG/L )      |         |          | DET'N LIMIT = 0     | GUIDELINE = 620. (G)   |
| SEP                   | BDL     | .000 RMP |                     |                        |
| OCT                   | BDL     | .000 RMP |                     |                        |
|                       | BDL     | .000 RMP |                     |                        |
| NOV                   | BDL     | .000 RMP |                     |                        |
|                       | BDL     | BDL      |                     |                        |
|                       | BDL     | BDL      |                     |                        |
| <hr/>                 |         |          |                     |                        |
| M-XYLENE (UG/L )      |         |          | DET'N LIMIT = 0     | GUIDELINE = 620. (G)   |
| SEP                   | BDL     | .200 UIN |                     |                        |
| OCT                   | BDL     | .200 <T  |                     |                        |
|                       | BDL     | .200 <T  |                     |                        |
| NOV                   | BDL     | .200 <T  |                     |                        |
|                       | BDL     | BDL      |                     |                        |
|                       | BDL     | BDL      |                     |                        |
| <hr/>                 |         |          |                     |                        |
| O-XYLENE (UG/L )      |         |          | DET'N LIMIT = 0     | GUIDELINE = 620. (G)   |
| SEP                   | BDL     | BDL      |                     |                        |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT        |         |                 | DISTRIBUTION SYSTEM     |
|------------------------------|---------|-----------------|-------------------------|
|                              | RAW     | TREATED         |                         |
| <hr/>                        |         |                 |                         |
| OCT                          | BDL     | .100 <T         |                         |
|                              | BDL     | .100 <T         |                         |
| NOV                          | BDL     | .100 <T         |                         |
|                              | BDL     | BDL             |                         |
|                              | BDL     | BDL             |                         |
| <hr/>                        |         |                 |                         |
| 1,1 DICHLOROETHYLENE (UG/L ) |         | DET'N LIMIT = 0 | GUIDELINE = 7.0 (D1)    |
| SEP                          | BDL     | .000 SPS        |                         |
| OCT                          | BDL     | BDL             |                         |
|                              | BDL     | BDL             |                         |
| NOV                          | BDL     | BDL             |                         |
|                              | BDL     | BDL             |                         |
|                              | BDL     | BDL             |                         |
| <hr/>                        |         |                 |                         |
| CHLOROFORM (UG/L )           |         | DET'N LIMIT = 0 | GUIDELINE = 350.0 (A1+) |
| SEP                          | BDL     | 122.000         |                         |
| OCT                          | BDL     | 140.000         |                         |
|                              | BDL     | 105.000         |                         |
| NOV                          | BDL     | 135.000         |                         |
|                              | BDL     | 111.000         |                         |
|                              | BDL     | 90.000          |                         |
| <hr/>                        |         |                 |                         |
| DICHLOROBROMOMETHANE (UG/L ) |         | DET'N LIMIT = 0 | GUIDELINE = 350.0 (A1+) |
| SEP                          | BDL     | 12.300          |                         |
| OCT                          | BDL     | 10.900          |                         |
|                              | BDL     | 9.600           |                         |
| NOV                          | BDL     | 10.300 APS      |                         |
|                              | BDL     | 8.300           |                         |
|                              | BDL     | 9.050           |                         |
| <hr/>                        |         |                 |                         |
| CHLORODIBROMOMETHANE (UG/L ) |         | DET'N LIMIT = 0 | GUIDELINE = 350.0 (A1+) |
| SEP                          | BDL     | .500 <T         |                         |
| OCT                          | BDL     | .500 <T         |                         |
|                              | BDL     | .400 <T         |                         |
| NOV                          | BDL     | BDL             |                         |
|                              | BDL     | BDL             |                         |
|                              | BDL     | .400 <T         |                         |
| <hr/>                        |         |                 |                         |
| T-CHLOROETHYLENE (UG/L )     |         | DET'N LIMIT = 0 | GUIDELINE = 10.0 (C2)   |
| SEP                          | .100 <T | BDL             |                         |
| OCT                          | BDL     | BDL             |                         |
|                              | BDL     | BDL             |                         |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

| WATER TREATMENT PLANT        |     | DISTRIBUTION SYSTEM                         |
|------------------------------|-----|---------------------------------------------|
|                              | RAW | TREATED                                     |
| <hr/>                        |     |                                             |
| NOV                          | BDL | BDL                                         |
|                              | BDL | .200 <T                                     |
|                              | BDL | BDL                                         |
| <hr/>                        |     |                                             |
| TOTL TRIHALOMETHANES (UG/L ) |     | DET'N LIMIT = 0      GUIDELINE = 350.0 (A1) |
| SEP                          | BDL | 134.800                                     |
| OCT                          | BDL | 151.400                                     |
|                              | BDL | 115.000                                     |
| NOV                          | BDL | 145.300                                     |
|                              | BDL | 119.300                                     |
|                              | BDL | 99.450                                      |
| <hr/>                        |     |                                             |

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

## COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

| SCAN<br>----     | PARAMETER<br>-----   | ANALYSED<br>----- | DETECTION LIMIT<br>----- | GUIDELINE<br>----- |
|------------------|----------------------|-------------------|--------------------------|--------------------|
| CHEMISTRY (LAB)  | CYANIDE              | 12                | 0.001                    | .200 (A1) MG/L     |
| METALS           | ARSENIC              | 12                | 0.001                    | .050 (A1) MG/L     |
|                  | BERYLLIUM            | 12                | 0.001                    | .0002 (H) MG/L     |
|                  | CADMIUM              | 12                | 0.300                    | 5.000 (A1) UG/L    |
|                  | LEAD                 | 12                | 0.003                    | .050 (A1) MG/L     |
|                  | SELENIUM             | 12                | 0.001                    | .010 (A1) MG/L     |
| CHLOROAROMATICS  | HEXACHLOROBUTADIENE  | 12                | 1.000                    | 450. (D4) NG/L     |
|                  | 123 TRICHLOROBENZENE | 12                | 5.000                    | 10000. (I) NG/L    |
|                  | 1234 T-CHLOROBENZENE | 12                | 1.000                    | 10000. (I) NG/L    |
|                  | 1235 T-CHLOROBENZENE | 12                | 1.000                    | 10000. (I) NG/L    |
|                  | 124 TRICHLOROBENZENE | 12                | 5.000                    | 10000. (I) NG/L    |
|                  | 1245 T-CHLOROBENZENE | 12                | 1.000                    | 38000. (D4) NG/L   |
|                  | 135 TRICHLOROBENZENE | 12                | 5.000                    | 10000. (D4) NG/L   |
|                  | HEXACHLOROETHANE     | 12                | 1.000                    | 1900. (D4) NG/L    |
|                  | OCTACHLOROSTYRENE    | 12                | 1.000                    | N/A NG/L           |
|                  | PENTACHLOROBENZENE   | 12                | 1.000                    | 74000. (D4) NG/L   |
|                  | 236 TRICHLOROTOLUENE | 12                | 5.000                    | N/A NG/L           |
|                  | 245 TRICHLOROTOLUENE | 12                | 5.000                    | N/A NG/L           |
|                  | 26A TRICHLOROTOLUENE | 12                | 5.000                    | N/A NG/L           |
| CHLOROPHENOLS    | 234 TRICHLOROPHENOL  | 6                 | 50.                      | N/A NG/L           |
|                  | 2345 T-CHLOROPHENOL  | 6                 | 50.                      | N/A NG/L           |
|                  | 2356 T-CHLOROPHENOL  | 6                 | 50.                      | N/A NG/L           |
|                  | 245-TRICHLOROPHENOL  | 6                 | 50.                      | 2600000(D4) NG/L   |
|                  | 246-TRICHLOROPHENOL  | 6                 | 50.                      | 10000. (C1) NG/L   |
| PAH              | PHENANTHRENE         | 12                | 0                        | N/A NG/L           |
|                  | ANTHRACENE           | 12                | 0                        | N/A NG/L           |
|                  | PYRENE               | 12                | 0                        | N/A NG/L           |
|                  | BENZO(A)ANTHRACENE   | 12                | 0                        | N/A NG/L           |
|                  | CHRYSENE             | 12                | 0                        | N/A NG/L           |
|                  | DIMETH. BENZ(A)ANTHR | 12                | 0                        | N/A NG/L           |
|                  | BENZO(E)PYRENE       | 12                | 0                        | N/A NG/L           |
|                  | BENZO(J) FLUORANTHEN | 12                | N/A                      | N/A NG/L           |
|                  | BENZO(B) FLUORANTHEN | 12                | 0                        | N/A NG/L           |
|                  | PERYLENE             | 12                | 0                        | N/A NG/L           |
|                  | BENZO(K) FLUORANTHEN | 12                | N/A                      | N/A NG/L           |
|                  | BENZO (A) PYRENE     | 12                | 0                        | 10 (B1) NG/L       |
|                  | BENZO(G,H,I) PERYLEN | 12                | 0                        | N/A NG/L           |
|                  | DIBENZO(A,H) ANTHRAC | 12                | 0                        | N/A NG/L           |
|                  | INDENO(1,2,3-C,D) PY | 12                | 0                        | N/A NG/L           |
|                  | BENZO(B) CHRYSENE    | 12                | 0                        | N/A NG/L           |
|                  | ANTHANTHRENE         | 12                | N/A                      | N/A NG/L           |
|                  | CORONENE             | 12                | 0                        | N/A NG/L           |
| PESTICIDES & PCB | ALDRIN               | 12                | 1.000                    | 700.0 (A1) NG/L    |
|                  | BETA BHC             | 12                | 1.000                    | 300. (G) NG/L      |
|                  | ALPHA CHLORDANE      | 12                | 2.000                    | 7000.0 (A1) NG/L   |
|                  | GAMMA CHLORDANE      | 12                | 2.000                    | 7000.0 (A1) NG/L   |

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

## COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

| SCAN                | PARAMETER             | ANALYSED | DETECTION LIMIT | GUIDELINE         |
|---------------------|-----------------------|----------|-----------------|-------------------|
| -----               | -----                 | -----    | -----           | -----             |
| PESTICIDES & PCB    | DIELDRIN              | 12       | 2.000           | 700.0 (A1) NG/L   |
|                     | METHOXYCHLOR          | 12       | 5.000           | 100000. (A1) NG/L |
|                     | THIODAN I             | 12       | 2.000           | 74000. (D4) NG/L  |
|                     | THIODAN II            | 12       | 4.000           | 74000. (D4) NG/L  |
|                     | ENDRIN                | 12       | 4.000           | 200.0 (A1) NG/L   |
|                     | THIODAN SULPHATE      | 12       | 4.000           | N/A NG/L          |
|                     | HEPTACHLOR EPOXIDE    | 12       | 1.000           | 3000.0 (A1) NG/L  |
|                     | HEPTACHLOR            | 12       | 1.000           | 3000.0 (A1) NG/L  |
|                     | MIREX                 | 12       | 5.000           | N/A NG/L          |
|                     | OXYCHLORDANE          | 12       | 2.000           | N/A NG/L          |
|                     | OPDDT                 | 12       | 5.000           | 30000. (A1) NG/L  |
|                     | PCB                   | 12       | 20.000          | 3000. (A2) NG/L   |
|                     | PP-DDD                | 12       | 5.000           | N/A NG/L          |
|                     | PPDDE                 | 12       | 1.000           | 30000. (A1) NG/L  |
|                     | PPDDT                 | 12       | 5.000           | 30000. (A1) NG/L  |
|                     | ATRATONE              | 12       | 50.             | N/A NG/L          |
|                     | ALACHLOR              | 12       | 500.            | 35000. (D2) NG/L  |
|                     | ETHYLENE DIBROMIDE    | 12       | 0               | 50.0 (G) UG/L     |
|                     | HCB                   | 12       | 1.000           | 10.0 (C1) NG/L    |
| SPECIFIC PESTICIDES | TOXAPHENE             | 12       | N/A             | 5000. (A1) NG/L   |
|                     | AMETRYNE              | 12       | 50.00           | 300000. (D3) NG/L |
|                     | ATRAZINE              | 12       | 50.00           | 60000. (B3) NG/L  |
|                     | BLADEx                | 12       | 100.00          | 10000. (B3) NG/L  |
|                     | PROMETONE             | 12       | 50.00           | 52500. (D3) NG/L  |
|                     | PROPazine             | 12       | 50.00           | 16000. (D2) NG/L  |
|                     | PROMETRYNE            | 12       | 50.00           | 1000. (B3) NG/L   |
|                     | SENCOR                | 12       | 100.00          | 80000. (B2) NG/L  |
|                     | SIMAZINE              | 12       | 50.00           | 10000. (B3) NG/L  |
|                     | 2,4,5-T               | 6        | 50.00           | 35000. (D2) NG/L  |
|                     | 2,4-D                 | 6        | 100.00          | 100000. (A1) NG/L |
|                     | 2,4-DCLRPHENOXYBUTYRC | 6        | 200.00          | 18000. (B3) NG/L  |
|                     | 2,4-DP                | 6        | 100.00          | N/A NG/L          |
|                     | DICAMBA               | 6        | 100.00          | 87000. (B3) NG/L  |
|                     | PICHLORAM             | 6        | 100.00          | 2450000 (D3) NG/L |
|                     | SILVEX                | 6        | 50.00           | 10000. (A1) NG/L  |
|                     | DIAZINON              | 4        | 20.             | 14000. (A1) NG/L  |
|                     | DICHLOROVOS           | 4        | 20.             | N/A NG/L          |
|                     | DURSBAN               | 4        | 20.             | N/A NG/L          |
|                     | ETHION                | 4        | 20.             | 35000. (G) NG/L   |
|                     | GUTHION               | 4        | N/A             | N/A NG/L          |
|                     | MALATHION             | 4        | 20.             | 160000. (G) NG/L  |
|                     | MEVINPHOS             | 4        | 20.             | N/A NG/L          |
|                     | METHYL PARATHION      | 4        | 50.             | 7000. (B3) NG/L   |
|                     | METHYLTRITHION        | 4        | 20.             | N/A NG/L          |
|                     | PARATHION             | 4        | 20.             | 35000. (B1) NG/L  |
|                     | PHORATE               | 4        | 20.             | 35.0 (D2) NG/L    |
|                     | RELDAN                | 4        | 20.             | N/A NG/L          |
|                     | RONNEL                | 4        | 20.             | N/A NG/L          |
|                     | AMINOCARB             | 4        | N/A             | N/A NG/L          |
|                     | BENOMYL               | 4        | N/A             | N/A NG/L          |
|                     | BUX                   | 4        | 2000.           | N/A NG/L          |

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY 1987

## COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

| SCAN                | PARAMETER                 | ANALYSED | DETECTION LIMIT | GUIDELINE         |
|---------------------|---------------------------|----------|-----------------|-------------------|
| -----               | -----                     | -----    | -----           | -----             |
| SPECIFIC PESTICIDES | CARBOFURAN                | 4        | 2000.           | 18000. (D3) NG/L  |
|                     | CIPC                      | 4        | 2000.           | 350000. (G) NG/L  |
|                     | DIALATE                   | 4        | 2000.           | 30000. (H) NG/L   |
|                     | EPTAM                     | 4        | 2000.           | N/A NG/L          |
|                     | IPC                       | 4        | 2000.           | N/A NG/L          |
|                     | PROPOXUR                  | 4        | 2000.           | 90000. (G) NG/L   |
|                     | SEVIN                     | 4        | 200.            | 70000. (A1) NG/L  |
|                     | SUTAN                     | 4        | 2000.           | 245000. (D3) NG/L |
|                     | METOLACHLOR               | 12       | 500.            | 50000. (B3) NG/L  |
| VOLATILES           | DICHLOROMETHANE           | 12       | 0               | 1750. (D3) UG/L   |
|                     | 1,1,2,2-DICHLOROETHYLENE  | 12       | 0               | 350. (D3) UG/L    |
|                     | 1,1,1,1-TETRACHLOROETHANE | 12       | 0               | N/A UG/L          |
|                     | 1,1,1,2-TETRACHLOROETHANE | 12       | 0               | 200. (D1) UG/L    |
|                     | 1,1,2,2-TETRACHLOROETHANE | 12       | 0               | 5.0 (D1) UG/L     |
|                     | CARBON TETRACHLORIDE      | 12       | 0               | 5.0 (D1) UG/L     |
|                     | 1,1,2,2-TETRACHLOROETHANE | 12       | 0               | 10.0 (G) UG/L     |
|                     | TRICHLOROETHYLENE         | 12       | 0               | 5.0 (D1) UG/L     |
|                     | 1,1,2,2-TETRACHLOROETHANE | 12       | 0               | .60 (D4) UG/L     |
|                     | BROMOFORM                 | 12       | 0               | 350.0 (A1+) UG/L  |
|                     | 1,1,2,2-TETRACHLOROETHANE | 12       | 0               | 0.17 (D4) UG/L    |
|                     | CHLOROBENZENE             | 12       | 0               | 1510. (D3) UG/L   |
|                     | 1,4-DICHLOROBENZENE       | 12       | 0               | 75.0 (D1) UG/L    |
|                     | 1,3-DICHLOROBENZENE       | 12       | 0               | 130. (G) UG/L     |
|                     | 1,2-DICHLOROBENZENE       | 12       | 0               | 130. (G) UG/L     |
|                     | TRIFLUOROCYCLOHEXADIENE   | 12       | 0               | N/A UG/L          |

## Appendix A

### DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

#### Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate ( and retrofit if necessary ) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw ( ambient water ) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.



Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

#### Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

#### DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

#### PROGRAM INPUTS

##### PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and

missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

#### 4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

#### 5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

#### 6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area;
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

#### 7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

#### FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

## LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will be made and intercomparison data documented.

#### PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

#### PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

#### QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

### ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

### REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

### ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

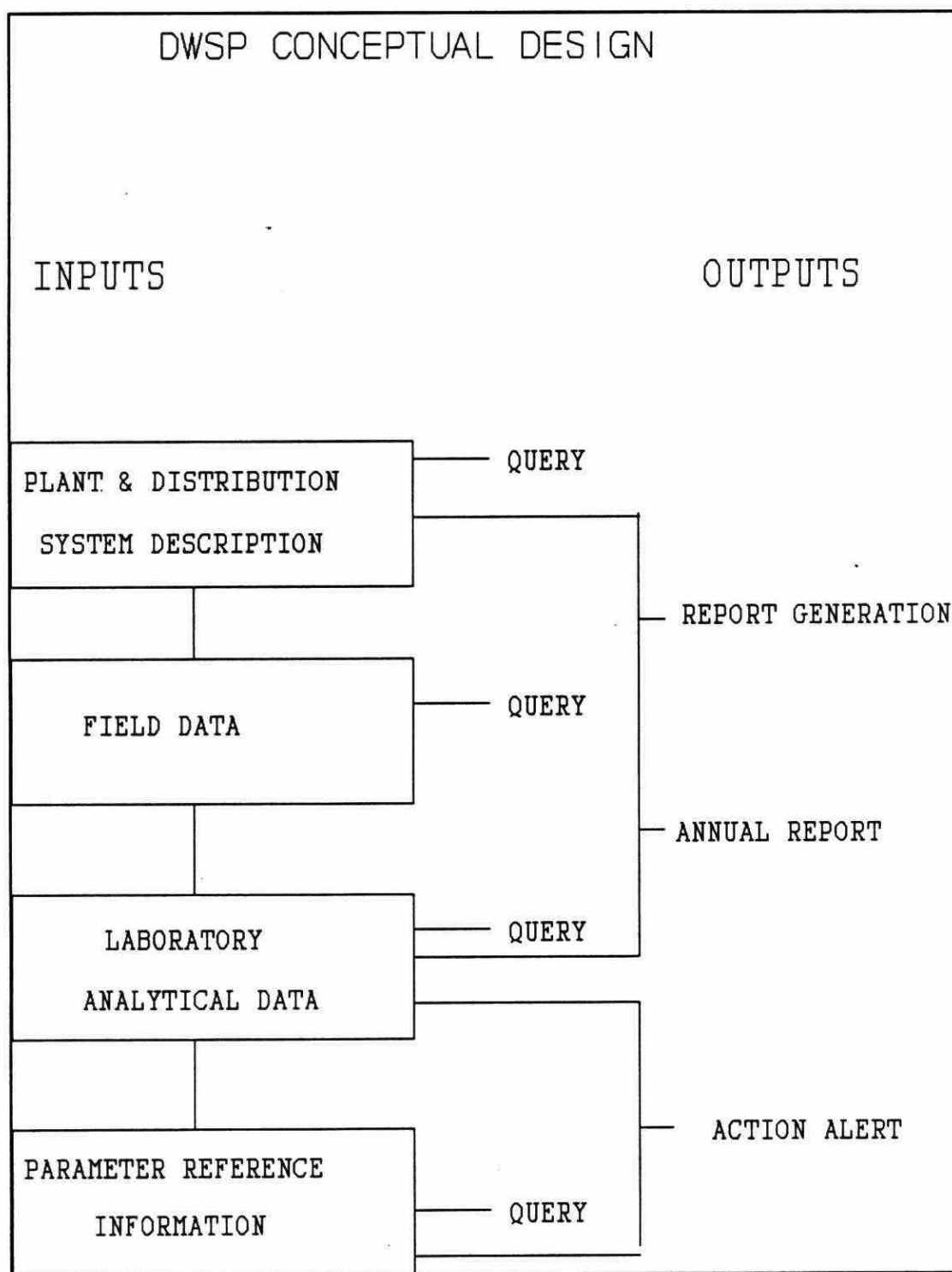




FIG.2

## MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P)  
REFERENCE  
BENZENE

## PARAMETER

| SOURCE | FROM    | TO | METHOD | TARG  | UNIT        | NOTE |
|--------|---------|----|--------|-------|-------------|------|
| EPA    | C 86/04 |    | NOMETH | .00   | 063000 UG/L | RMCL |
| EPAA   | C 80/11 |    | NOMETH | 6.60  | 063000 UG/L |      |
| FERC   | C 84/05 |    | NOMETH | 1.00  | 063000 UG/L |      |
| WHO    | C 84/01 |    | NOMETH | 10.00 | 064000 UG/L |      |

## DESCRIPTION: NAME: BENZENE

CAS#: 71432

MOLECULAR FORMULAE:  $C_6H_6$ 

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L

SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27),  
CYCLOHEXATRIENE (41)CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE,  
NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE,  
AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)

## PROPERTIES:

SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)

THRESHOLD ODOUR: NO DATA

THRESHOLD TASTE: 0.5 MG/L IN WATER (39)

ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING  
ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL  
TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE  
MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL  
QUANTITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY  
SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL  
TAR DISTILLATION, FOOD PROCESSING, TANNING.USES: PREPARATION OF ETHYL BENZENE USED AS A STYRENE  
MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN  
PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY,  
DEGREASING AND CLEANSING AGENT, GASOLINE.TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES  
MUCOUS MEMBRANES, SYMPTOMS INCLUDE RESTLESSNESS,  
CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE;  
CHRONIC - ANEMIA AND LEUKEMIA (45).

CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN

REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM  
FOLLOWED BY SEDIMENTATION, COAGULATION AND  
FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).

MOLECULAR WEIGHT: 78.12 GRAMS

MELTING POINT: 5.5 DEGREES C (27)

BOILING POINT: 80.1 DEGREES C (27)

SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)

VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C

HENRY'S LAW CONSTANT: 0.00555 ATM  $M_2$ /MOLE

LOG OCT./WATER PAR.COEFF:K=1.0 1/N=1.6 R=.97 PH=5.3

## Appendix B

### DWSP SAMPLING GUIDELINE

#### i) RAW and TREATED at PLANT

|                                      |                                                                                                                                                                                                                                                                     |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Chemistry                    | <ul style="list-style-type: none"><li>-500 mL clear plastic bottle</li><li>-rinse bottle with sample three times and discard water</li><li>-fill to line</li></ul>                                                                                                  |
| Bacti                                | <ul style="list-style-type: none"><li>-250 mL clear glass bottle with white seal on cap</li><li>-do <u>not</u> rinse bottle; preservative has been added</li><li>-avoid touching bottle neck or inside of cap</li><li>-fill to top of red label as marked</li></ul> |
| Metals                               | <ul style="list-style-type: none"><li>-500 mL clear plastic bottle with white lid</li><li>-rinse bottle and cap three times, discard</li><li>-fill to line</li><li>-add 10 drops nitric acid<br/>(Caution: <math>\text{HNO}_3</math> is corrosive)</li></ul>        |
| Volatiles<br>(OPOPUP)                | <ul style="list-style-type: none"><li>-250 mL clear glass bottle</li><li>-do <u>not</u> rinse bottle</li><li>-tilt bottle when filling</li><li>-fill bottle completely; there should be no air bubbles.</li></ul>                                                   |
| Organic<br>(OWOC), (OWTRI), (OAPAHX) | <ul style="list-style-type: none"><li>-1 liter brown glass bottle per scan</li><li>-do <u>not</u> rinse bottle</li><li>-fill to approx. 1" from top</li><li>-when 'special pesticides' are requested three extra bottles per sample must be submitted</li></ul>     |
| Cyanide                              | <ul style="list-style-type: none"><li>-500 mL clear plastic bottle</li><li>-do <u>not</u> rinse bottle</li><li>-fill to approx. 1" from top</li><li>-add 10 drops sodium hydroxide<br/>(Caution: <math>\text{NaOH}</math> is corrosive)</li></ul>                   |

Mercury

- 250 mL clear glass bottle
- rinse bottle and cap three times, discard then fill to top of label
- add 20 drops each nitric acid and potassium dichromate
- (Caution:  $\text{HNO}_3$  and  $\text{KCrO}_7$  corrosive)

Phenols

- 250 mL clear glass bottle
- do not rinse bottle
- fill to top of label as marked

Steps

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry

- 500 mL clear plastic bottle
- rinse bottle with sample three times and discard
- fill to line

Metals

- 500 mL clear plastic bottle with white lid
- rinse bottle and cap three times, discard
- fill to line
- add 10 drops nitric acid  
(Caution:  $\text{HNO}_3$  is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

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|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Chemistry          | <ul style="list-style-type: none"><li>-500 mL clear plastic bottle</li><li>-rinse bottle with sample three times and discard water</li><li>-fill to line</li></ul>                                                                                                                                        |
| Bacti                      | <ul style="list-style-type: none"><li>-250 mL clear glass bottle with white seal on cap</li><li>-do <u>not</u> rinse bottle; preservative has been added</li><li>-avoid touching bottle neck or inside of cap</li><li>-fill to top of red label as marked</li></ul>                                       |
| Metals                     | <ul style="list-style-type: none"><li>-500 mL clear plastic bottle with white lid</li><li>-rinse bottle and cap three times, discard</li><li>-fill to line</li><li>-add 10 drops nitric acid<br/>(Caution: <math>\text{HNO}_3</math> is corrosive)</li></ul>                                              |
| Volatiles<br>(OPOPUP)      | <ul style="list-style-type: none"><li>-250 mL clear glass bottle</li><li>-do <u>not</u> rinse bottle; preservative has been added</li><li>-tilt bottle when filling</li><li>-fill bottle completely; there should be no air bubbles</li></ul>                                                             |
| Organic<br>(OWOC), (OWTRI) | <ul style="list-style-type: none"><li>-1 liter brown glass bottle per scan</li><li>-do <u>not</u> rinse bottle: preservative has been added</li><li>-fill to approx. 1" from top</li></ul>                                                                                                                |
| Cyanide                    | <ul style="list-style-type: none"><li>-500 mL clear plastic bottle</li><li>-do <u>not</u> rinse bottle: preservative has been added</li><li>-fill to approx. 1" from top</li><li>-add 10 drops sodium hydroxide<br/>(Caution: <math>\text{NaOH}</math> is corrosive)</li></ul>                            |
| Mercury                    | <ul style="list-style-type: none"><li>-250 mL clear glass bottle</li><li>-rinse bottle and cap three times, discard then fill to top of label</li><li>-add 20 drops each nitric acid and potassium dichromate<br/>(Caution: <math>\text{HNO}_3</math> and <math>\text{KCrO}_7</math> corrosive)</li></ul> |

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

TD/434/B397/1988  
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Bayside School Water  
Treatment Plant. Annual  
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